

JACKSON (H.)

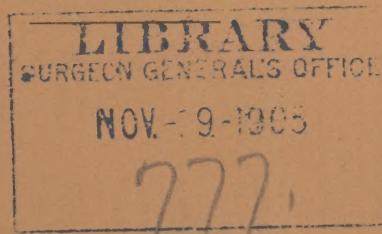
A REVIEW OF THE DISEASES CONTRACTED
IN THE CUBAN CAMPAIGN OF 1898

BY

HENRY JACKSON, M.D.

ASSISTANT VISITING PHYSICIAN, BOSTON CITY HOSPITAL

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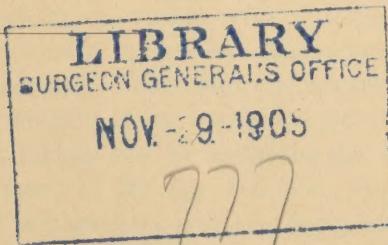
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A REVIEW OF THE DISEASES CONTRACTED IN THE
CUBAN CAMPAIGN OF 1898. ONE HUNDRED
AND TWENTY-THREE MEN.

BY HENRY JACKSON, M.D.

FROM the twenty-third of August to the first of October between four and five hundred men were admitted to the Boston City Hospital, most of whom had served in Cuba; a few had been in camp at Chickamauga, or in some of the camps situated in Florida. One hundred and twenty-three of these men were entered on the first medical service.

Great interest attaches to these cases from a medical point of view, in that they offered us the first opportunity to study in a large number of cases, the various phases of malaria of the estivo-autumnal type.

Taken as a whole, these men presented many interesting phenomena. They were all dark, their skins having a peculiar yellow or brownish color, sometimes with a tinge described as muddy; many hardly looked like Anglo-Saxons, resembling rather the Armenians. The color was apparently dependent upon several factors; first, sun-burn, which of course was an important factor, but by no means the only cause of the color, as in many of the men a similar, though less marked, discoloration was seen all over the body, which had been protected by the clothing; destruction of the blood pigment evidently played quite an important part in producing the color noted, as the tint was similar to that seen in some blood diseases, as pernicious anemia, where there is destruction of blood pigment. Finally, anemia, present in a large number of the men, was important in producing the color; the anemia was evidently severe in grade, though

unfortunately the stress of work made exact counting of the corpuscles in many cases impossible; in the cases where a red count was made the number was reduced by one-half.

Almost invariably they were thin, the few exceptions only proving the rule, while many can be described only as emaciated; their eyes were sunken and lustreless, their cheeks hollow, and their bones were alarmingly prominent. In these men described as emaciated not only was there no fat tissue, but the skin had lost its elasticity and the muscles were reduced to the smallest possible size.

It was noteworthy that very few showed any evidence of skin diseases due either to neglect of proper care in washing or to vermin; in a few cases only was there edema of the legs and feet not dependent upon kidney disease.

Mentally they were marked by extreme apathy; one was not impressed that they suffered and repressed their pain, but rather that they were indifferent to pain and discomfort. Also in small ways many seemed unbalanced, almost childish in their opposition to minor hospital rules or in their wish to do things considered by the physicians as inadvisable or absolutely harmful. I dwell especially upon these changes in their mental balance because the same characteristics were noted by Dr. Prescott at Montauk and by a man, not a physician, who had charge of a station at Long Island City, where large numbers of troops were fed and cared for while *en route* from Montauk to various points in New York and the West. Dr. Prescott has said that this lack of mental balance was a source of much trouble, in that men who had been furloughed insisted upon leaving camp when they were not actually sick, and yet not well enough to travel alone. Actual delirium or wandering was seen in several cases where there was no fever sufficient to cause such a disturbance; it was dependent apparently simply upon weakness, and in each instance passed off in a few days.

There has been much discussion as to whether the sickness amongst the troops could be directly traced to carelessness or negligence on the part of the officers; after careful consideration it seems to me that in only a few instances could the diseases be traced to any source than the climatic

conditions of Cuba. Theoretically the fourteen cases of dysentery and the twenty-one cases of typhoid should have been prevented, but these diseases played but a small part in causing the sickness in comparison with the large number of cases of malaria. It cannot and should not be denied that improper and insufficient food was an important factor in causing the debilitated condition of the men.

The cases may be classified as follows:

Malaria	46	cases.
Typhoid fever	18	"
Typhoid fever and malaria	5	"
Dysentery	6	"
Dysentery and malaria	7	"
Amebic dysentery	1	case.
Debility, convalescents, etc.	37	cases.
Convalescence from yellow fever	2	"
"Collapse"	1	case.
Total	123	cases.

In all of the cases classified as malaria there was fever of a greater or less degree after they entered the hospital, those who had no fever after arriving from Cuba being classified as convalescents. Plasmodia were found in only twenty-nine cases; in eleven no blood examination was made; in eight no plasmodia were found. Several reasons may be brought forward to explain the apparent absence of plasmodia in well-marked cases; most of the men had taken quinine, some in large doses, so that it is probable that but few organisms were present; many left the hospital after a short time, going to various outlying hospitals to convalesce. In proof of the latter statement, in three cases where no plasmodia were found when the first examination was made, the organisms were abundant when the men returned after a considerable interval with a renewal of the fever. And lastly the large amount of work of a necessary character made frequent examinations impossible when the treatment of the case was not dependent upon the finding of the plasmodia. The men were so sick that in no case did I dare to

delay in giving large doses of quinine at once, so that failing to find the organisms on the first examination a second opportunity might not present itself in another rise of temperature. The organisms found were of the estivo-autumnal type in twenty-four cases, hyaline intra-corpuscular forms and crescents or ovoid bodies; occasionally pigmented forms were seen in which the granules were larger and less numerous than in the tertian plasmodia, these forms resembling rather the quartan organisms. The crescents were often present in large numbers, two, three, or more being often seen in a single field of the microscope. In three cases the tertian plasmodia were found, and these cases differed essentially from the majority in the mild character of the disease, and the readiness with which the fever yielded to quinine.

The type of the fever was varied; in one class there was a mild fever for a few days, gradually falling to normal, and without subsequent rise in temperature; in others an irregular temperature with daily rise and fall continuing for a week or so, these cases probably representing a type dependent upon the cycle of development of a single set of plasmodia. Many cases represented the typical remittent form of malaria, or at least one period of the remittent fever was developed and carried through in the hospital, suggesting that the patient had previously passed through similar periods of fever. In others, there was a continued type of fever closely resembling the course of the temperature in an average case of typhoid fever; these two latter types being of the variety which has given rise to the name "typho-malaria;" and, lastly, three cases representing the virulent type of malaria called "pernicious."

The type of the fever was independent of the treatment, as all of the cases were treated alike with large doses of quinine. Investigation of recent years makes it probable that the long-continued malarial fevers are dependent upon the presence of many sets of plasmodia, each reaching maturity at a different time and giving rise to a continuous, or almost continuous, type of fever.

Twenty-one cases with fever of short duration.

None of these men showed the emaciation so marked in those who had more severe types of malaria; some were in very good condition, but as a rule they were thin, anemic, and had the color seen in the majority of the cases previously described.

In general in all the various forms of malaria similar accounts were given of their previous condition. Fever had been present for periods varying from four to six weeks with intervals of comparative health; the periodicity of the fever differed in the various cases, but apparently bore no relation to the type presented when they entered the hospital. In some the sickness began with chills followed by fever and sweating, and the fever continued but without repetition of the chills; in others the chills recurred every day, every other day, every three days, or once a week. Many of them were quite exact in their statements as to the height of the fever, saying that their temperature had been 104° or 105° on many succeeding days. In many cases the so-called chills were not true rigors with shaking, but rather a sensation of chilliness or cold followed by periods of fever; in others true rigors were accurately described, rigors of great severity and long duration. A medical student, who acted as hospital steward in one of the hospitals, tells me that he saw true rigors in only a comparatively small number of the men who had malaria. While in the hospital very few men had rigors, certainly not more than half a dozen; in many the rise of temperature was not accompanied by sensations of cold, while in others, probably the majority, the men felt uncomfortable, rather cold and wanted to draw the blankets up over the shoulders. When rigors appeared at all they were of great severity and long continued. The absence of rigors accompanied by rapid pulse and great constitutional disturbance was in marked contrast to the usual picture in the tertian forms of malaria seen in this neighborhood.

Diarrhea was a prominent feature in most of the cases; many had from five to twenty movements daily while in Cuba, the dejections being large, watery, and occasionally mixed with blood. Vomiting was frequently described, but not often of long continuance. Headache, dizziness and blurring of the sight were present in many of the cases.

I give a few histories as types :

Case I. — Man, 23 years, 9th Mass. Vols. Well nourished, anemic. Entered the hospital September 10. About the middle of August, while in Cuba, he had pains in the hips, back and legs, with slight fever but no chills; there was headache and blurring of the vision; some diarrhea with large, watery dejections, not accompanied by abdominal pain.

Hyaline intra-corporeal plasmodia were found. He seemed very sick upon entrance, but improved rapidly. Quinine was given subcutaneously on entrance.

Case II. — Man, 41, 9th U.S. Cavalry. Well nourished. Entered September 13. Early in August he had fever, with headache and vomiting of greenish matter; no chills. He also had cough with white expectoration. During the week previous to entrance he had felt chilly every other day. He was weak upon entrance to the hospital but improved rapidly. Plasmodia found on September 16.

Case III. — Man, 28, 2d Mass. Vols. Anemic, thin and very weak. Entered hospital August 30. Towards the end of July he had chills and fever; later he was delirious, vomited a great deal and had large watery movements. He was then up and about his regular work; for some days before entrance to the hospital he was weak and had headache and diarrhea. On September 2 many crescents were found and a few hyaline bodies. He improved rapidly.

Ten cases of fever of irregular type, with intermissions. These men were in general more seriously sick than the preceding class.

Case I. Man, 25, 9th Mass. Vols. Anemic, thin, very weak, and on entrance somewhat delirious. He entered September 6. While in Cuba he had two chills, followed by fever and sweating, and since then there had been fever, but no chills. He had ten or twelve movements daily, the dejections being large and watery, with some blood; there had been abdominal pain and tenderness, but without tenesmus and no vomiting. No plasmodia were found until September 15. The temperature was marked by sharp remissions with rapid, irregular rise in the fever, but there were no chills; quinine was given in large doses from the day of entrance. He improved gradually, and was sent to a convalescent hospital in two weeks.

Case II. Man, 20, 9th Mass. Vols. Emaciated and anemic. He entered the hospital on August 30. Six weeks previously he was taken suddenly with great weakness and general prostration, having pains all over the body; he then had chills, fever, and sweating

daily. He had diarrhea continuously, the dejections averaging ten a day, of a watery character. He went to his home September 2, and remained there for a month. During his first stay at the hospital his temperature was normal, and no plasmodia were found. While at home he was weak, and was in bed much of the time. In the last week of September he had a chill and later a sensation of chilliness, with fever and sweating every other day. When he re-entered he was pale, had a peculiar yellow color, and the sclera were also a lemon yellow. The heart was enlarged in all directions, and a soft systolic murmur was heard at the apex and over the pulmonic valves. The spleen was very hard, and extended by measurement to a point one and a half inches above the umbilicus. Hyaline intra-corporeal plasmodia were found. For nearly two weeks he had rise of temperature every third day, but no rigors. He improved gradually, but remained in the hospital for many weeks on account of great weakness and anemia; when discharged the spleen was much reduced in size, being just palpable; he was fat and in good general health.

Case III. Man, 25, U.S. Regular 10th Cavalry. Fairly well nourished, anemic. Entered hospital August 21. He went to Cuba in June, took part in the battle of San Juan, July 1 and 3, and in the bombardment of Santiago, July 10 and 11. About the middle of July he had chills and fever, the chills recurring almost daily until July 25. After an interval the chills recurred, and he left Cuba August 2. The spleen was felt three inches below the margin of the ribs, and was sensitive to pressure. Hyaline plasmodia and crescents were found. He was discharged August 27, and told to consult a doctor, which he did not do.

One week after leaving the hospital he had a chill, and at irregular intervals subsequently he had fever, until he re-entered the hospital on October 6.

When he re-entered he was pale, the red corpuscles numbering 2,168,000; the spleen was hard, and was felt four inches below the ribs. Plasmodia were found. The temperature rose to 104.5° the day after entrance, but there was no chill; subsequently the temperature was normal.

Four cases of fever of remittent type.

In addition to these four cases there was a fifth who had dysentery associated with the malaria, the case being reported in the class of dysentery and malaria.

These men were all very sick.

Case I.—Man, 24, 9th Mass. Vols. He entered the hospital September 6. He was very sick, emaciated, pale and sallow in

color; on entrance he was delirious, and for many days his condition was critical; for three weeks he was unable to leave the bed, and was not discharged from the hospital for two months.

Early in August he was taken suddenly with chills and fever, marked by great prostration; the fever and sweating continued at intervals up to the time of his entrance to the hospital. Diarrhea, vomiting and severe headache marked the course of his sickness.

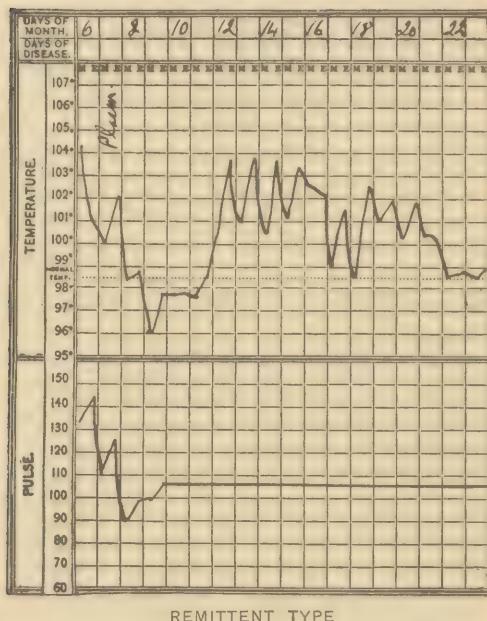
The right side of the heart was enlarged; the spleen was hard and felt one inch below the ribs. Many crescents were found in the blood. Diarrhea continued in the hospital. He had fever of an irregular type, marked by remissions without intermission for ten days; quinine did not check the fever, though under its use

there was a steady improvement in his general condition. The delirium was present only during the high fever at entrance and did not recur, though he was extremely apathetic for a long time.

Case II. — Man, 23, 9th Mass. Vols. Fairly well nourished. Entered September 16. In August he had, in Cuba, chills and fever, but improved after leaving Cuba, and was fairly well until a few days before entrance, when he had headache, chilly sensations, with fever and sweating. No diarrhea, but occasional vomiting.

Hyaline plasmodia were found. The spleen was not very large. He was at no time critically sick and convalesced rapidly after the temperature reached normal.

Case III. — Man, 22, 9th Mass. Vols. Thin, anemic, weak. Entered the hospital September 6. On July 15 he had severe headache, delirium, no chills or fever; later occasional chills came on accompanied by fever and sweating. In August had diarrhea; lost twenty-five pounds; crescents were found in the blood. While in the hospital he had high fever but no chills; his only complaint was of weakness. He was discharged to a convalescent hospital



September 20. He re-entered the hospital October 6; he had been in bed for two days on account of fever and sweating; on the day of entrance he had a chill. The spleen was felt half-way between the margin of the ribs and the umbilicus; in this case purpuric spots were found scattered over the legs and thighs; they were not observed in any other case; there was a severe general bronchitis; plasmodia were found; Widal negative. In a week he improved rapidly.

Six cases of fever of continued type like typhoid.

Case I. Man, 34, 7th U.S. Regulars. Emaciated, anemic. Entered the hospital September 13. From July 21 to August 12 he had fever and headache; was then all right for two weeks, when he again had fever, headache and diarrhea; no chills. Since the end of August he had had no fever, but constant diarrhea and a good deal of abdominal pain.

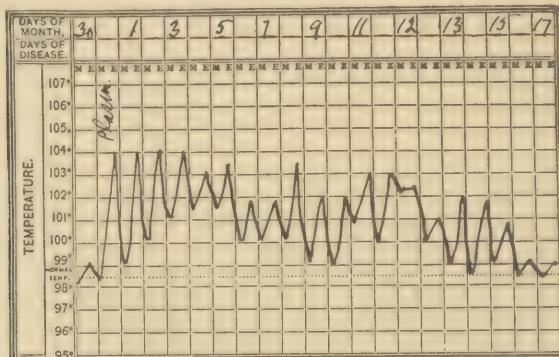
On September 15, hyaline plasmodia were found, and on the 17th crescents; Widal negative. For three weeks the fever continued, and during this time he was very weak and had diarrhea most of the time; crescents were again found on the 28th of September. He was confined to his bed for six weeks on account of weakness, but his convalescence, though slow, was steady.

Case II. Man, 21, U.S. Regulars. Was pale, weak and thin. He entered August 30. Early in August he had general pains in the bones, chills followed by fever and sweating, which recurred every three days, and profuse diarrhea. Plasmodia were found. He had fever but no chills after entrance; he improved rapidly in spite of the continued fever.

In the latter two classes the differential diagnosis from typhoid was extremely difficult; the type of fever was the same as in the cases of combined typhoid and malaria. No single sign was characteristic of either disease; several symptoms pointed more strongly towards one disease than the other. The spleen in malaria was less hard and smaller; the tongue often dry and glazed, but not coated with a thick dirty pasty coat so common in typhoid. The lethargy and stupor of typhoid were not seen in malaria; delirium in malaria was apparently associated with the high fever, and when this passed off the men were often apathetic, but did not present the mental condition usually seen in typhoid. Rose spots when seen were important.

Three cases of pernicious malaria fever.

To these might be added a fourth classified under the head of malaria and dysentery, as it was complicated by the latter disease, but the severity of the disease and the death of the patient seemed dependent rather upon the malaria than the dysentery.



REPRESENTING A CONTINUED TYPE OF MALARIAL FEVER.

The term pernicious is applied to these cases because of the severity of the acute symptoms produced by the malaria. One man entered the hospital in the height of an attack, while in the other two the symptoms came on after entrance to the hospital. They had very high fever, 105° or over, they were unconscious, cyanotic, with cold and clammy skin; the pulse was rapid, feeble, and in fact, hardly perceptible at the wrist.

Case I.—Man, 22, 4th Artillery U.S.A. Anemic, sallow, emaciated. Entered the hospital August 23. He was unconscious upon entrance, but later the following history was obtained: About the middle of July he had chills and fever, the chills recurring every day for a week; he then had fever for a long time, but no chills; he complained of weakness, dizziness, and said he had vomited occasionally; he was given cold baths, stimulants freely, and quinine subcutaneously, and soon recovered consciousness, though he was delirious for several days.

As shown by the chart there was a gradual but steady fall in the temperature and great improvement in his general condition.

Case II.—Man, 23, 20th U.S. Infantry. Was very pale, thin, but not emaciated, sallow in color. He was conscious upon entrance, though wandering at times. The first of August he had chills and fever, the chills recurring regularly every other day for

two weeks. While in hospital at Santiago he was delirious, had severe headache, general muscular pains, and, during the last part of August, pain, redness and swelling in the knees. There had been profuse diarrhea with a few intervals of constipation.

On the day after entrance his temperature rose suddenly to 105°, his pulse was rapid and thready, and he was absolutely unconscious; for two days the temperature was normal, when it began to rise and continued to do so daily in spite of large doses of quinine. During the second attack of fever he was not unconscious, but was delirious during a part of the time; his only complaint was of headache; no chills were seen while he was in the hospital. His convalescence was slow.

Case III. — Man, 23, 2d U.S. Regulars. Anemic, emaciated, and very weak upon entrance. He entered the hospital on September 6. About the first of August he had headache, pains all over the body and great weakness; he had fever with much sweating but no chills; mentally he was sluggish, but not delirious. A few hours after entrance he became comatose, was deeply cyanotic, the skin was cold and clammy and the pulse could hardly be felt at the wrist. For two days he remained practically in the same condition, though the coma was less marked; on the fourth day he recognized his brother, and spoke to the doctor. On September 12th he did not seem so well, areas of consolidation were found in both lungs, though his condition was so serious as to make a complete examination impossible. He died the next day, and the account of the post-mortem examination follows: Autopsy, three hours post-mortem.

Clinical Diagnosis Malaria. Body well developed and nourished; length, 179 cm; pupils slightly dilated; slight rigor mortis; over the anterior aspect of the right leg, just below ankle there were two areas with loss of epithelium, and several small blebs filled with clear serous fluid.

Abdomen: Large intestine much distended; a few slight adhesions between cecum and coils of small intestine; mesenteric glands normal; diaphragm fourth rib each side.

Pleuræ: Both pleuræ contained a slight amount of yellowish watery fluid; surface of both lungs were covered with a thin yellowish white fibrinous exudate; this was more marked over the middle and lower lobes of the right lung and over the lower lobe of the left lung; over the middle lobe of the right lung it formed a firm, thick, yellowish, false membrane. Pericardium normal. Heart weight, 355 grammes. Measurements: Tricuspid valve 12.5 cm. Pulmonary valve 6.5 cm.; Mitral valve 11 cm.; aortic valve 6.5 cm.; thickness of left ventricle 1.8 cm.; of right ventricle 0.6 cm.; valves and cavities normal; fresh preparation of myocardium shows no fat.

Right lung: Upper lobe distended, cushiony, and along the edges are seen distended air vesicles; middle lobe almost completely

solidified; beneath the thick false membrane, previously described, the lung is exceedingly firm, elevated above the rest of the lung substance and on section shows two portions distinctly marked off from one another; the outer portion of the pleurae, about 2 cm. in width, is composed of a dark red, glistening, slightly granular, firm tissue; while the inner portion, which makes up the rest of the consolidated area, is grayish white in color, very granular, firm, and has a slightly foul odor; fresh section of this preparation shows the dark red area to have an exudate composed of considerable fibrin and few cells, while the gray area is almost entirely cellular; the lower portion of the upper lobe and the posterior portion of the lower lobe, dark red in color; rather firm; exceedingly edematous, slightly granular, but glistening, very much injected, and a portion removed sinks in water.

Left lung: Beneath the pleura of the upper lobe are many very fine hemorrhages; here and there scattered through this lobe are a few firm, dark red areas about $\frac{1}{2}$ cm. in diameter, raised above the surface of the lung. In the lower portion of this lobe is an area of solidification, 6 by $3\frac{1}{2}$ cm., exceedingly firm; on section grayish red in color, and in the centre is a small cavity, $\frac{1}{2}$ cm. in diameter, filled with soft yellowish puriform fluid, smears from which show many pus cells, epithelial cells and a variety of organisms, among which are distinguished a long, thin bacillus, a spore-bearing bacillus, elongated diplococci and flattened diplococci occurring in short chains; lower lobe shows a lax consolidation of same nature as that in the lower lobe of right lung; it involves two-thirds of the lung, and is sharply marked off from the normal lung tissue at the base; mucous membrane of bronchi injected; cut ends of bronchi show considerable muco-pus; bronchial glands enlarged, pigmented.

Spleen, weight, 245 grammes. Capsule smooth; surface of a dark slate color; on section the surface is dark brown in color, glistening, and relieved here and there by very few minute whitish points — the Malpighian bodies; on scraping no pulp is removed; frozen section shows a large amount of black pigment.

Stomach: Mucous membrane normal, except in the cardiac end, where there is a small irregular whitish area, about 1 by $\frac{1}{2}$ cm., with firm, indurated base; the mucous membrane over this area is smooth (suggestive of healed ulcer).

Liver, weight, 1960 grammes. Capsule smooth, dark brown in color, firm; on section markings indistinct; here and there are seen minute reddish specks, between which the substance is of a slate color; fresh section shows central fat, dark pigment, particularly in Kupfer's cells.

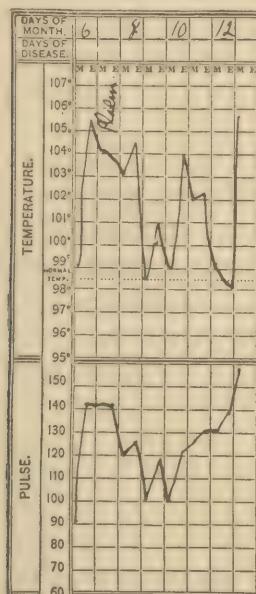
Gall bladder distended, contains about 40 c.c. of very dark yellowish fluid with exceedingly mucoid material and granular sediment.

Kidneys, weight, 355 grammes. Capsule peels easily; on section cortex, pale; relations between cortex and pyramids normal; fresh section shows no fat. Aorta, normal. Bladder, prostate and testicles normal. Bone marrow, dark red in color, firm. Head not opened.

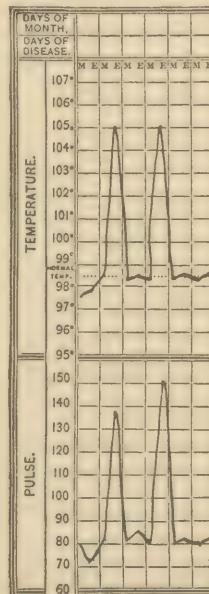
Smears from pleuræ and lungs show a variety of organisms, among which is the lanceolate diplococcus.

Anatomical Diagnosis: Acute lobar pneumonia; acute broncho pneumonia; abscess of lung; acute fibrinous pleurisy; pigment in liver and spleen; healed gastric ulcer.

In all these cases plasmodia were found, and the Widal reaction was negative. Quinine was given in large doses both by mouth and subcutaneously; baths were used to reduce the temperature, but without any practical result; strychnine was given subcutaneously as a stimulant, also alcohol in large doses. It is noticeable that the spleen was not very large in any of these men.



PERNICOUS MALARIA.



TERTIAN MALARIA.

Three cases of tertian infection.

In three men the tertian organisms were found; the men were not much sick, were not emaciated, though thin, and the fever ceased after the exhibition of a single large dose of quinine.

As a striking picture, in sharp contrast to the irregular charts of the preceding cases of malaria of the estivo-autumnal type, I give the chart of a case of ordinary tertian malaria, which represents the course of the fever seen in cases having their origin in this neighborhood. Note the rapid pulse associated with the rigor and rise of temperature.

Spleen: The great hardness of the spleen was noticeable in all the cases; in all cases it was enlarged, and in many enormous, reaching nearly to the umbilicus. Where the spleen was very large there was usually a good deal of tenderness; one man complained of great pain in the left side, the only explanation being found in a greatly enlarged spleen, which extended almost to the umbilicus, and practically filled the lower left axillary region. The great enlargement seemed to be associated rather with a long continuance of a moderate fever than with excessively severe types of fever. In one case, on another service, autopsy showed a spleen weighing 760 grammes.

Under the treatment by quinine and the subsequent use of iron and arsenic the spleen diminished rapidly in size.

Treatment: Alcohol was given to all cases where the pulse showed any tendency to weakness, and this was often re-enforced by strychnine or digitalis. Quinine was given in large doses, always in capsule; pills are unreliable, and solutions are hard to take when such large doses are necessary. In many instances dilute sulphuric acid was given after the capsules. Bromide of ammonium or small doses of morphine checked the disagreeable ringing in the ears. In most of the cases twenty grains of quinine were given after the temperature had fallen one degree from the acme, and later five grains were given three times a day; in a few cases larger doses were given. In other cases the method of Dock was employed, giving twenty grains after the temperature fell a degree, and then giving fifteen or twenty grains every seven days for four weeks. This treatment was employed only in the cases where the temperature was normal the second day and remained so subsequently. In certain instances quinine was given subcutaneously, the preparation used

being the bisulphate dissolved in a weak solution of tartaric acid.

Rx	Quin. bisulphat.	.	.	.	Gr. V
	Ac. tartarici	.	.	.	Gr. V
	Aq.	.	.	.	3 j.
	M.				

Quinine is not the quick and satisfactory specific in estivo-autumnal malaria that it is in tertian malaria; the men usually improved after quinine was given, often markedly, but in many instances, as shown by the charts published, the fever continued in unabated force. The continuance of the fever I believe to be due to the co-existence of many sets or crops of the plasmodia, each crop giving rise to fever when it reaches maturity. A single large dose of quinine appears to kill all organisms that have reached a certain stage of development; this I think is shown in the cases where after a long interval of normal temperature a sharp rise occurs, the "Dock" method is employed and subsequent rapid convalescence follows without further attacks.

Eighteen cases of typhoid fever: Five of the men had been stationed in the southern camps; thirteen were in Cuba. Two of the men died; one was extremely sick upon entrance, was constantly delirious, had incessant vomiting, and died upon the third day. The men who came from the southern camps were not so emaciated as the men that came from Cuba, but they had a typhoid of a more severe type. As a rule the cases were not very severe, some being convalescent, in whom the diagnosis was made by the Widal reaction.

Most of them had diarrhea, headache, weakness and general pains for several weeks before they were admitted to the hospital; in two or three instances there had been one or more chills. By the history, therefore, it was impossible to form any accurate opinion as to the diagnosis, as many of the cases of malaria gave a similar history, though in the latter disease chills were usually a more important factor. In many cases analysis of the blood alone made an accurate diagnosis possible. The chief points in favor of typhoid may be stated as follows: lethargy or stupor without very high

temperature; disturbance of the mental condition was seen in the malarial cases only when the temperature was very high, as in the so-called pernicious forms. A tongue heavily coated, or with a moist pasty coat. In typhoid the spleen was not so large or so hard as in the malaria cases. Abdominal tenderness and rose spots when present. The pulse in typhoid was relatively to the temperature lower and often dicrotic. Herpes was common in the malarial cases and not found in the typhoid cases. The Widal serum reaction was absolutely positive in fourteen cases, doubtful in one case; negative in one case that died very shortly after entrance, so that only one examination was made. It was negative in two cases classified as typhoid; in these two cases the history, the mental condition, the dejections, the course of the fever, all pointed to typhoid fever, and therefore this diagnosis was made; in each case repeated examinations failed to show the presence of plasmodia.

Two charts are given, one illustrative of a mild typhoid, the other a severe case, complicated by a large intestinal hemorrhage.

In five cases there was a mixed infection, malaria and typhoid fever. These cases are reported in detail by Dr. Withington in another article in this volume, and I will only say here that the course of the typhoid fever was apparently unmodified by the malaria; the malaria making itself manifest by a sharp rise in temperature late in convalescence.

Dysentery, fourteen cases: One case amebic dysentery; seven cases of dysentery with malaria, four ending fatally; six cases of dysentery without malaria, one ending fatally.

One case of amebic dysentery: A man of about forty years, entered August 30. He was thin, having lost a great deal of flesh, as was shown by a photograph taken when he enlisted, but he was not emaciated, as were many of the men who had other forms of dysentery; he was very weak. About the middle of July he was taken suddenly with fever, general pains, severe headache and was much prostrated; for two weeks he had profuse diarrhea, but continued on duty and lived on army rations. He took quinine, which had no effect upon his trouble. He entered the field hospital August 1, for ten days; in the hospital he had continuous fever, but no chills or sweating. During this time his movements were large,

watery, greenish, with blood and mucus; he did not have much pain; when discharged he was very weak, the diarrhea continued, and he had occasional vomiting. On entrance he complained especially of great weakness, and his appearance certainly corresponded with his feelings.

The liver and spleen were not enlarged; the abdomen was flat, tympanitic, not rigid and somewhat tender. His movements were small, accompanied by pain, but without marked tenesmus; they consisted of bloody mucus, with the addition of a small amount of fecal matter. *Amebæ* were found in the mucus; they were large, actively motile bodies, with nucleus and vacuoles. No doubt was felt by many observers who saw these bodies as to the correctness of the diagnosis. The temperature was elevated on the day of entrance, but fell to normal the following day and remained so during his stay in the hospital; throughout his sickness his pulse was between 70 and 80.

Five grains of quinine were given by mouth three times a day; the lower bowel was irrigated with a solution of quinine, twenty grains to the quart, the irrigations being given every six hours.

In a few days he improved, but had a good deal of pain when the bowels moved for the first week; after ten days the dejections were yellow and partially formed. He had two subsequent attacks of looseness of the bowels.

His improvement was rapid, and when he left the hospital on October 18 he had almost regained his former weight and appeared well.

This is the only case of amebic dysentery that has come under my observation early in the disease, the other cases that I have seen belonging to the class of cases called clinically "chronic diarrhea;" it seems possible that the early treatment of this case by quinine injections may have destroyed the *amebæ* before any extensive ulcerations had taken place.

This man re-entered the hospital in March, 1899, with a recurrence of dysentery.

Seven cases of dysentery and malaria: On entrance all of these men were emaciated to the last degree. In most of them the skin seemed to be tightly stretched over their bones, and the atrophy of the muscles was as marked as the entire absence of subcutaneous fat tissue. I have never seen cases showing such marked emaciation, except occasionally in cancer, where the disease has been so

situated as not to interfere directly with life, so that the individual could live as long as the heart had strength enough to beat. The mental condition was even more alarming than the physical condition; in all there was delirium during a part of the day and in two there was constant delirium till death. But more alarming than the delirium was the persistent and marked apathy; the men barely spoke unless questions were asked; they often hardly complained of pain when they were having constant bloody dejections and took no interest in what was going on about them. No pen can describe the impression made upon me by these men; several had weighed 175 pounds or more at the opening of the campaign and lay in their beds mere skeletons, with minds as weak as their bodies. Three recovered.

Case I.—Entered August 23. He was a man of large frame, very pale, emaciated, apathetic, with occasional periods of mild delirium. For several days there was edema of the lower extremities, with a good deal of pain if the legs were extended, so that he lay in bed with the thigh flexed. The pulse was weak and thready.

About the first of August he had a chill, followed by fever, and the fever had continued since then, but without the recurrence of chills. For two weeks his movements had been small, frequent, with blood and mucus. There was tenderness all over the abdomen, most marked along the course of the colon. The spleen was enlarged to percussion and the edge was easily felt.

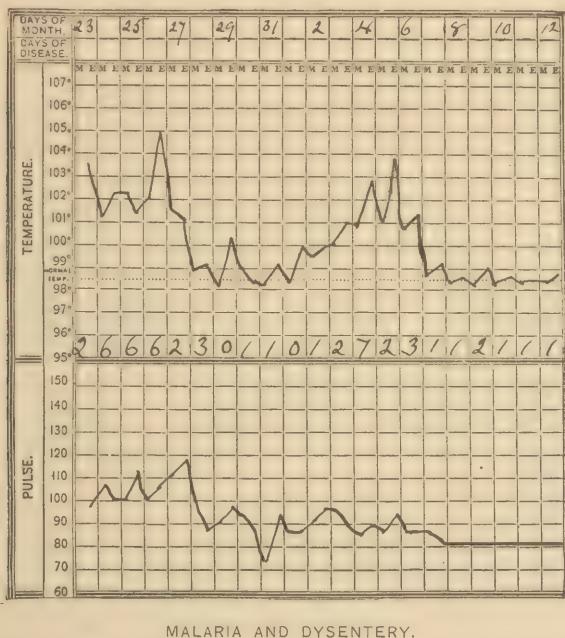
For the first few days the movements were small, loose, very frequent, bright green in color, and mixed with blood and mucus. Vomiting occurred but rarely after he entered the hospital, though he was able to take but a small amount of food; from day to day death seemed imminent, but the pulse remained at a fair rate, rising only once to 120, and in the course of three weeks he was really convalescent.

In this case, after, and perhaps because of, the exhibition of large doses of ipecac, the stools soon lost their green color, the blood disappeared and in a few days they were simply soft yellow discharges.

An air bed added greatly to his comfort. When he gradually recovered from the profound collapse present on entrance, he complained of great abdominal pain, which was controlled by morphine.

No plasmodia were found until the fifth of September, during the second rise of temperature, when organisms of the estivo-autumnal type were found. The chart is given on page 19.

On September 28, when it was first possible to weigh him, his weight was 127 pounds; October 14, he weighed 160 pounds.



MALARIA AND DYSENTERY.

Two other cases recovered; in both there was a history of chills, fever and sweating recurring daily, or every other day for a long time. Though they both had fever of a moderate degree in the hospital, plasmodia were not found in either case. One of them had a herpes zoster extending over a large area on the right flank, abdomen and thigh, which caused far more pain and distress than the dysentery. In this case a long-continued diarrhea followed the dysentery, and for weeks the man remained about as thin as upon entrance, though he gradually improved and in six weeks was discharged well.

In neither of these cases was the mental condition so serious as in the fatal cases; they were not delirious, and their condition mentally may be described rather as one of apathy and weakness.

Four cases died, three living less than a week, and one living, or rather existing, for three weeks.

In one the entry of "no history" speaks more eloquently of his condition than any words; he was so weak and so delirious that it was impossible to get any account of his previous condition.

In two of the cases there was a history of a chill some three weeks before entrance to the hospital, followed by fever and sweating, but without rigors; in each instance there was abdominal pain with great tenderness and many movements, green in color, with blood and mucus. They were delirious upon entrance and remained so throughout their sickness, developing subsultus tendinum before death. Vomiting was constant from the first, vomiting without nausea, rather regurgitation of all food taken, which absolutely prevented all attempts at giving nourishment.

In the fourth case there was a post-mortem examination and, therefore, I give the history and course of the disease in detail.

A man of thirty-six years, 9th Mass., Vols. Entered the hospital August 30. Since the early part of July he had had profuse diarrhea, the dejections varying in number from fifteen to thirty daily. At first the dejections were light in color and watery, later becoming more scanty and dark or reddish in color. There was a good deal of abdominal pain, which was relieved by the movements; the feces had a very foul odor.

He was markedly emaciated, with sunken cheeks and deep hollows under the eyes; the mental condition was one of profound weakness and apathy, with mild wandering at times.

Examination of the heart, lungs, liver and spleen showed nothing abnormal. The abdomen was lax, tympanitic, and was somewhat tender all over, especially so over the descending colon. No amebæ were found in the stools. The bowels moved frequently, the dejections being small in size, with blood, mucus and greenish matter. As in the other cases the number of dejections marked upon the chart gives no adequate idea of their frequency, as often he was for a long time upon the bed-pan before it was removed.

On September 6 many crescents were found in the blood and a few hyaline forms.

At first he was able to take only a very small amount of food; for several days he retained only somatose in broth.

On September 10 he was decidedly better, could take more food, and the blood had disappeared from the dejections; improvement continued for a week, when on September 17 he passed a considerable

amount of pure blood, and from this time failed gradually to his death on September 24. After the hemorrhage he was almost pulseless, all food was vomited, and up to the time of his death he retained only teaspoonful doses of peptonized milk.

Autopsy three-fourths of an hour post mortem. Clinical diagnosis: Dysentery. Body was still warm; no rigor mortis; body length, 169 cm., slim, extremely emaciated. Abdomen retracted so that the umbilicus rests on the lumbar vertebrae. Eyeballs deeply sunken in sockets. The right pupil dilated more than the left.

Abdominal cavity. Intestines contracted to the size of a finger, lying on each side of the vertebral column. Almost no sign of fat in omentum or mesentery. Bladder moderately dilated.

The diaphragm fifth rib left side; fourth space right side.

On opening thorax lungs contracted to a considerable degree. They were downy, of a pale pinkish-white color with very little pigmentation. No adhesions.

Heart small, weight, 185 grammes. Flabby. Valves and cavities normal. Blood in cavities fluid, but coagulated soon on exposure to air. On fresh examination no fatty degeneration present.

Left lung apparently normal. The bronchi of the right lung contained yellowish mucoid, purulent material, not very abundant. In the lower lobe were several pale grayish, but fairly translucent, solidified areas, from which on section thin pus could be squeezed.

Spleen, weight, 95 grammes. The anterior edge much lobulated. Color of a greenish black. On section the cut surface showed the same dark greenish black color. Microscopically much black pigment was present in cells.

Gastro-intestinal tract. Stomach contracted down so as to be almost tube-like in shape. Its length along lesser curvature was 15.5 cm. Along the greater curvature, 20.5 cm. Its circumference at the cardiac end was 11.5 cm. At the pyloric end, 7 cm. The wall felt thick; probably due to contraction. On opening it the stomach was empty. The mucous membrane drawn into longitudinal folds, which in places were somewhat injected. The small intestine was practically empty throughout its entire length. Wall thickened from contraction. Mucous membrane pale. Peyer's patches not visible. In large intestine, beginning at the anus and extending almost to cecum, the mucous membrane showed many ulcerations extending down to the muscular coat. The ulcerations varied in size from 2 to 3 mm. to several cm. in diameter. They were irregular in shape. The mucous membrane was much undermined, and many of the ulcerations communicated with each other beneath bridges of mucous membrane. The mucous membrane which was left was swollen, and in places rather deeply injected. In other places it was of a grayish color. A very little soft yellowish fecal material was present. On the whole, the ulcerations

were more extensive in the rectum and in the descending colon and less abundantly marked in the upper portion of the ascending colon. No mucus or blood could be found in the contents of the large intestine. Examination of the material from the surface of the mucous membrane and at the base of the ulcers beneath the mucous membrane was negative for *amebæ coli*.

Liver, weight, 930 grammes. Greenish black in color. On section presented the same dark color. Lobules easily made out. On fresh examination much black and reddish brown pigment present, particularly in the peripheries of the lobules.

Kidneys, combined weight, 245 grammes. Capsule peeled with difficulty. Surface slightly granular. On section cortex about normal in thickness; pale, rather translucent; markings not distinct. Reaction for amyloid negative. Microscopical examination of fresh section showed much fatty degeneration. Very small amount of light yellowish crystals in tubules.

Aorta. Intima practically normal. Only in places could a few yellowish specks be made out. Testicles normal. Bladder normal. Adrenals normal. Pancreas normal.

Anatomical diagnosis: Ulcerative colitis (amebic?); acute bronchitis and broncho-pneumonia; malarial pigmentation of spleen and liver; chronic diffuse nephritis.

Cultures: Heart and spleen, sterile. Liver and kidney, colon bacillus. Lung, micrococcus lanceolatus.

Six cases of dysentery in which there was no proof of malaria, either from the history or from the physical examination; two died, one shortly after entrance, the dysentery being complicated by pulmonary tuberculosis, and the other after a lingering illness of nine weeks. Two of the men were fairly well nourished, while four were much emaciated. Mentally they were bright, were not delirious with the exception of the case rapidly fatal and did not show the apathy so marked in the cases of dysentery associated with malaria. In three the temperature was normal and the pulse not very rapid; in one there was a temperature very suggestive of malaria, though there had been no history of chills, fever, or sweating, and no plasmodia were found.

In the case that lived for nine weeks there was throughout irregular fever with one sharp rise and during the last few days of life a temperature with extreme variations similar to the charts seen in sepsis. During seven weeks the pulse did not rise above 110 or fall below 100. The

abdomen was tender, rigid, and the stools at first consisted almost entirely of bloody mucus; there was a gradual improvement in his general condition, the dejections were yellow and infrequent, he was bright and cheerful, with a good appetite, but the loose movements returned, and he succumbed.

Treatment: In the cases with malaria, quinine was given in large doses as has been described in the report of the malarial diseases; where vomiting was present it was given subcutaneously, though without effect. Hot boric acid or alkaline injections were given in all cases and they seemed at least to afford temporary relief. Morphine was given to most of the cases, especially when pain was a prominent symptom, but without any apparent effect in checking the frequency of the dejections. Bismuth alone or in combination with salol was used in large doses, this drug being more useful in checking the dejections than morphine. The only astringent that appeared to me useful was tannigen, given in ten-grain doses. I rarely used large and continued doses of salines to wash out the bowels as all of the men were in a very weak condition, and in none of them on entrance did I dare to run the risk of the possible debilitating effect of large watery dejections. In a good many cases I gave the treatment used so extensively in India and China, ipecac and morphine; in two cases "post" and perhaps "propter" there was an almost immediate change in the character of the dejections. The green color, the blood, and the mucus disappeared, and in two or three days the stools were yellow. No vomiting was caused and there was no depressing effect even in the men who were very sick. The method employed was to give one-sixth of a grain of morphine subcutaneously, and half an hour later to give twenty grains of powdered ipecac in capsules; this treatment was repeated every six hours.

In giving rectal injections in dysentery great care must be taken not to distend the large intestine; I have seen a large intestine from a case of amebic dysentery that was ruptured in several places; the man collapsed immediately after a rectal injection and died in a few hours.

Convalescent men: Thirty-seven cases were in the hospital for a few days only, awaiting transference to their homes or to other neighboring hospitals where convalescents were received; nineteen passed but one day at the City Hospital. These men, like the others who were more seriously sick, showed marked evidences of the diseases and hardships from which they had suffered; eighteen had lost much flesh and many of them were weak on entrance; three were "emaciated;" one was in such a debilitated condition that in spite of his having no fever he was delirious for the first few days. Eleven of the men were in fairly good condition, suffering only from general weakness which prevented them from walking. They none of them had any fever during their stay in the hospital. Perhaps the most marked physical sign, apart from loss of flesh, was the great apathy noted in most of the men.

None of the men were in the hospital sufficiently long to enable us to make an exact diagnosis, but judging from their history most of them were convalescing from malaria. Undoubtedly many had relapses after leaving the hospital. The following table gives the symptoms complained of:

Chills and fever	.	.	.	.	.	.	.	.	.	.	9 cases.
Chills and fever.	Diarrhea	.	.	.	.	.	.	.	.	.	10 "
Chills and fever.	Diarrhea.	Vomiting	.	.	.	.	.	.	.	.	4 "
Chills and fever.	Insolation	.	.	.	.	.	.	.	.	.	2 "
Diarrhea	.	.	.	.	.	.	.	.	.	.	4 "
Diarrhea. (Nephritis)	.	.	.	.	.	.	.	.	.	.	1 case.
Weakness	.	.	.	.	.	.	.	.	.	.	5 cases.
Jaundice	.	.	.	.	.	.	.	.	.	.	1 case.
Syphilis	.	.	.	.	.	.	.	.	.	.	1 "
Total											87 cases.

The two cases having respectively nephritis and jaundice gave no evidence in their history of a preceding malaria.

Those who had diarrhea in Cuba described a most severe form, many of them having had eighteen to twenty movements a day. Some of the cases had true rigors, with general shaking; more of them described their chills as a sensation of cold, followed by sweating, but without shaking. The attacks of fever lasted a few days, were followed by a period of weakness, when the fever again returned.

Two cases convalescent from yellow fever.

Both were members of the 2d Mass. Vols. They entered the hospital on August 30. They were well-developed men; the one in fair general condition and the other thin, poorly nourished and anemic.

Case I.—About the first of August he was taken suddenly sick, having at this time severe headache and backache; two days later vomiting came on and on one occasion was described as being brown. The attack lasted about a week, and apparently was not severe.

For two days there was fever, but later it was normal. No plasmodia of malaria were found.

Case II.—Towards the end of July he was taken suddenly with a severe chill, and for the next two weeks remembered nothing of what occurred. He was told that during this time he was very sick and had frequent large involuntary dejections. During convalescence he was fairly comfortable, suffering only from a moderate diarrhea and weakness.

On entrance to the hospital he was weak, anemic, and his complexion had a peculiar, muddy color; the color of the skin was different in tone from that seen in the majority of the men who had been in Cuba, and who had suffered from malaria.

There was no fever. The patient had a moderate bronchitis, which cleared up rapidly. The spleen was enlarged, the edge being easily felt.

In both of these cases there was a marked discoloration of the finger nails that Dr. McCollom said was suspicious, and frequently seen in yellow fever; namely, at the root of the nail was a pinkish crescentic area marking the growth of the nail since the sickness; the older part of the nail had a deep yellow, almost saffron, color. In the two cases observed, this yellow discoloration of the nail was very different from the dirty brownish-yellow discoloration of the nails which was seen in the majority of the cases of malaria returning from Cuba.

I draw especial attention to this phenomenon, as, so far as I know, it is not mentioned in any printed article upon yellow fever; yet Dr. McCollom considers it of importance in the diagnosis. Both the men convalesced rapidly, and left the hospital in a few days.

Case of collapse. Acute gastro-enteritis:

A man of twenty-eight years, fine physique and fairly well nourished, was brought to the hospital late at night in an unconscious condition. He was a member of the 1st Maine Vols. and was *en route* from Chickamauga to Maine. On the train he was suddenly seized with vomiting and diarrhea, and when he reached Boston was so weak that he could not stand. We later found out that he had had diarrhea at Chickamauga for several weeks.

On entrance he was cold, cyanotic, at first absolutely unconscious, later partially conscious; his temperature was 97°, and the pulse rapid and scarcely perceptible; there was constant vomiting and small involuntary movements. His condition appeared so critical that he was quickly wrapped in blankets without removing his clothes; strychnine, atropia, and brandy were given subcutaneously. Nothing was given by mouth for several hours, and then he was given small doses of very hot water before any attempt was made to add nourishment. The following day he recovered consciousness and from this on made an uninterrupted recovery.

I give in detail this case, because, though it does not represent any type of a definite disease, it was to me the most remarkable instance of severe collapse due to exhaustion in a man previously perfectly healthy. I think my house officer, Dr. Stevens, made the correct diagnosis when he called the condition "Collapse of cholera infantum."

His temperature was 100° on the morning after entrance, later normal.

Examination of the heart: In view of the various disturbances of the heart seen in the soldiers of the rebellion, it is interesting to consider what conditions were found in the soldiers who returned from the Cuban campaign. It is as yet too early to form any opinion as to what the ultimate result will be, and most of the cases seen at the City Hospital were seriously ill. In the war in Cuba most of the men suffered from disease, insufficient diet and the tropical climate, whereas in the rebellion the severe physical strain involved in prolonged marches was considered as the most probable factor in causing the so-called "soldier heart." Few of the men in Cuba were subjected to physical strain from arduous or prolonged labor. As has been previously stated most of the men were anemic and many were

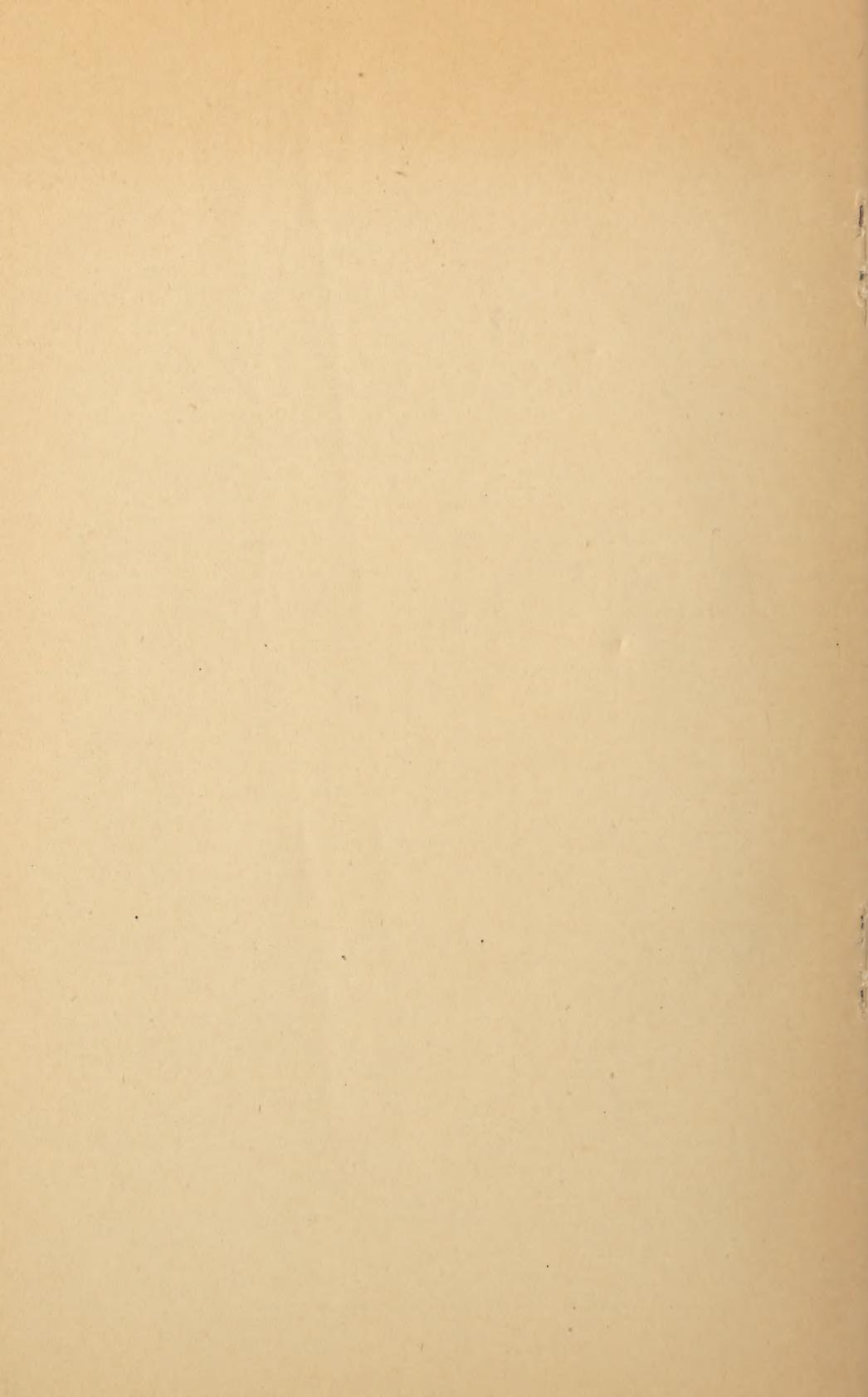
profoundly so, and it seems probable that the anemia played a more prominent part than strain in such disturbances of the heart as were found. The following data are collected from the physical examination of the heart in the 123 soldiers: Not abnormal, 69; enlarged, 18; no enlargement, murmurs, 36. Total, 123.

In the cases showing enlargement of the heart the sounds were clear in eight; in one there was a pulmonic murmur, and in one a murmur at the apex. In eight cases there was a murmur at the apex and over the pulmonic valve. In one case the enlargement was limited to the left side, in six to the right side, while in eleven cases both sides of the heart showed enlargement.

In thirty-six cases murmurs were heard in which percussion showed no enlargement of the heart; in eighteen the murmur was at the apex, in thirteen over the pulmonic area and in five at the apex and pulmonic area. In these latter cases the murmurs were undoubtedly hemic in origin.

None of the men complained of palpitation, distress in the cardiac region, or shortness of breath. Rapid or irregular action of the heart was found only in those seriously ill. As a matter of fact not only was no weakness or failure of the heart observed, but perhaps the one most prominent factor in these cases was the resistance offered to severe disease by men who were emaciated to a degree and yet showed a vitality that kept them alive as long as life was possible.

The saddest and yet the most encouraging feature in these cases was the action of the heart, sad because it showed what their health and strength must have been before they were reduced by disease; encouraging because it enabled these men to live as long as life was possible, considering the diseased conditions of organs other than the heart.



A 16 Sept